

RINGKASAN

Seiring bertambahnya jumlah penduduk menyebabkan konsumsi akan energi juga meningkat. Energi alternatif diperlukan sebagai pengganti sumber bahan bakar fosil yang jumlahnya semakin terbatas. Biopelet merupakan produk biomassa yang dapat dijadikan sebagai sumber energi alternatif pengganti bahan bakar fosil. Salah satu sumber biomassa yang memiliki potensi menjanjikan yaitu tongkol jagung dan daun jati. Tujuan penelitian ini yaitu untuk mengetahui karakteristik biopelet karbonisasi berbahan campuran tongkol jagung dan daun jati dengan perlakuan suhu pengeringan dan kadar perekat.

Bahan baku yang digunakan yaitu tongkol jagung dan daun jati hasil karbonisasi dengan perekat tepung tapioka. Metode pada penelitian ini yaitu Rancangan Acak Lengkap (RAL) faktorial yang tersusun atas 2 faktor yaitu kadar perekat dan suhu pengeringan. Faktor kadar perekat terdiri dari 3 taraf yaitu 10%, 15%, dan 20% serta faktor suhu pengeringan terdiri dari 3 taraf yaitu 90°C, 100°C, dan 110°C. Karakteristik biopelet yang diukur meliputi: kadar air, kadar zat terbang, kadar abu, kerapatan, *shatter index*, dan laju pembakaran. Data yang telah didapatkan selanjutnya dianalisis menggunakan metode *Analysis of Variance* (ANOVA) dan kemudian dilakukan uji *Duncan Multiple Range Test* (DMRT) jika perlakuan menunjukkan pengaruh nyata terhadap variabel yang diamati.

Hasil penelitian ini menunjukkan bahwa kadar air biopelet berkisar 10,89-43,41%bb, kadar zat terbang 90,57-94,56%, kadar abu 6,90-8,88%, kerapatan 0,50-0,80 g/cm³, *shatter index* 21,50-46,42 %, dan laju pembakaran 0,05-0,07 g/menit. Pada perlakuan kadar perekat memiliki pengaruh sangat nyata terhadap karakteristik biopelet diantaranya kadar air, kadar zat terbang, kadar abu, kerapatan, dan *shatter index*. Perlakuan suhu pengeringan memiliki pengaruh terhadap karakteristik biopelet diantaranya kadar air, kadar zat terbang, kadar abu, kerapatan, *shatter index*, dan laju pembakaran. Perlakuan kadar perekat 10% dan suhu pengeringan 110°C menghasilkan kondisi yang optimal pada parameter kadar air, kadar zat terbang, *shatter index*, dan laju pembakaran. Perlakuan kadar perekat 10% dan suhu pengeringan 90°C menghasilkan kondisi yang optimal pada parameter kadar abu. Perlakuan kadar perekat 15% dan suhu pengeringan 90°C menghasilkan kondisi yang optimal pada parameter kerapatan.

SUMMARY

As the population increases, energy consumption will also increase. Alternative energy is needed as a substitute for increasingly limited sources of fossil fuels. Biopellets are a biomass product that can be used as an alternative energy source to replace fossil fuels. One source of biomass that has promising potential is corn cobs and teak leaves. The purpose of this study was to determine the characteristics of carbonized biopellets made from a mixture of corn cobs and teak leaves with drying temperature and adhesive content.

The raw materials used are corn cobs and teak leaves carbonized with tapioca flour adhesive. The method in this study was a factorial Completely Randomized Design (CRD) consisting of 2 factors, namely adhesive content and drying temperature. The adhesive content factor consists of 3 levels, namely 10%, 15%, and 20% and the drying temperature factor consists of 3 levels, namely 90°C, 100°C, and 110°C. The characteristics of the biopellets measured included: moisture content, volatile matter content, ash content, density, shatter index, and burning rate. The data that has been obtained is then analyzed using the Analysis of Variant (ANOVA) method and then the Duncan Multiple Range Test (DMRT) is carried out if the treatment shows a significant effect on the observed variables.

The results of this study indicated that the water content of the biopellets ranged from 10.89-43.41% wb, the volatile matter content was 90.57-94.56%, the ash content was 6.90-8.88%, the density was 0.50-0.80 g/cm³, sharp index 21.50-46.42 %, and burning rate 0.05-0.07 g/minute. In the treatment the adhesive content had a very significant effect on the characteristics of the biopellets including moisture content, volatile matter content, ash content, density, and shatter index. Drying temperature treatment has an influence on the characteristics of biopellets including moisture content, volatile matter content, ash content, density, shatter index, and burning rate. Treatment of adhesive content of 10% and drying temperature of 110°C resulted in optimal conditions for the parameters of moisture content, volatile matter content, shatter index, and burning rate. Treatment with 10% adhesive content and 90°C drying temperature resulted in optimal conditions for the ash content parameter. Treatment of adhesive content of 15% and drying temperature of 90°C resulted in optimal conditions for the density parameter.